

Remarks/Arguments

Reconsideration of this application is requested.

Extension of Time

Submitted herewith is a request and fee for a three month extension of the period within which to respond to the Office Action mailed on March 3, 2003. The extended period for response expires on September 3, 2003.

Drawings

The drawings are objected to under 37 CFR 1.84(p)(5) for not including the reference numeral '47' mentioned in the description in Figure 1. The attached sheet of drawings adds reference numeral '47' to Figure 1 and replaces the original sheet including Figures 1 and 2a.

The drawings are also objected to under 37 CFR 1.83(a) for not showing an "interdigital capacitor" (claims 5 and 24) and a "wireless communication device" with a "transceiver comprising a bandpass filter" (claim 39). These features have been deleted from the claims and, accordingly, applicant submits that the drawings are now in compliance with 37 CFR 1.83(a).

Specification

The specification is objected to for inconsistent use of the abbreviations "f-e" and "FE" for "ferro-electric"; and "rf" and "RF" for "radio frequency". Applicant has amended the specification so that "ferro-electric" is consistently abbreviated as "FE" and "radio frequency" is consistently abbreviated as "RF". While reviewing the specification, applicant also noted inconsistency in the abbreviation of "direct current" and further amended the specification so that "direct current" is consistently abbreviated as "DC".

The specification is also objected to under 37 CFR 1.75(d)(1) and MPEP 608.01(o) for failing to provide proper antecedent basis for some of the claimed subject matter. The paragraph beginning at page 11, line 1, has been amended to provide antecedent basis for the subject matter of claims 8, 27 and 46. The paragraph beginning at page 11, line 20, has been amended to provide antecedent basis for the subject matter of claims 3, 13, 16, 22, 35, 41, 51 and 54. The paragraph beginning at page 17, line 11, has been amended to provide antecedent basis for the subject matter of claims 11, 14, 15, 30, 33, 34, 49, 52 and 53.

Claims

Claims 1-57 stand rejected under 35 USC 102 and 103 in view of U.S. patent no. 3,569,795 to Gikow (“Gikow”), U.S. patent no. 5,965,494 to Terashima et al. (“Terashima”) and Japanese patent publication no. 05-182857 to Toshiba (“Toshiba”). Claims 1-57 are canceled, without prejudice, and replaced with new claims 58-66 reciting features that clearly distinguish over the references of record.

Claims 58-62: The Bias Electrode is Narrower than the Ferro-Electric Layer

Independent claim 58 is directed to a tunable planar capacitor having a substrate, a bias electrode formed on the substrate, a ferro-electric layer formed over the bias electrode and capacitor electrodes formed over the ferro-electric layer and defining a gap, *wherein the bias electrode is more narrow than the ferro-electric layer*. This configuration is best seen in Figure 1, where bias electrode 14 is narrower and completely overlapped by ferro-electric layer 16. As stated in the specification at page 12, lines 10-15, this design feature provides the advantage of ensuring that there is no electrical contact between the bias electrode and capacitor electrodes.

The cited references say nothing about the dimensions or size of their bias electrodes relative to their ferro-electric layers, and hence cannot teach or suggest this claim limitation. The only indication in the references about the dimensions or size of the bias electrodes relative to the ferro-electric layers comes from the drawing figures, where the bias electrode is illustrated as being *exactly the same size* as the ferro-electric layer. See, for example, bias electrode 13 and ferro-electric layer 11 of Figure 1 of Gikow, and bias electrode 16 and dielectric layer 17 of Figure 1 of Terashima. The novel feature of making the bias electrode narrower than the ferro-electric layer is provided only by applicant’s invention.

Claim 59, depending from claim 58, adds the additional feature of shaping the bias electrode to limit RF current flow and reduce loss. Applicant’s specification describes two shapes in particular that have been found to limit current flow and reduce loss: the “open finger” and “closed finger” configurations. Dependent claims 60 and 61 set forth these bias electrode shapes. Finally, the specification sets forth a preferred finger width of one to two microns, which is set forth in dependent claim 62.

Claims 63-66: A Capacitance between the Capacitor and Bias Electrodes

Independent claim 63 is directed to a tunable planar capacitor having a substrate, a bias electrode formed on the substrate, a ferro-electric layer formed over the bias electrode and capacitor

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electrodes formed over the ferro-electric layer and defining a gap, *wherein the bias electrode is formed with sufficient size and thickness relative to the gap such that a capacitance exists between the capacitor electrodes and bias electrodes.* The equivalent circuit is shown in Figure 2B, which depicts capacitors 52 and 54 between capacitor electrodes 46 and 48, and bias electrode 50. As discussed extensively at pages 12-14, forming the bias electrode in this manner permits greater modification and control over the capacitor tuning characteristics, without change to the ferro-electric materials or thicknesses. The cited references do not teach or suggest configuring their bias electrodes to provide additional capacitances between the bias and capacitor electrodes. This novel feature is provided only by the present invention.

Claims 64-66 define this claim limitation in more detail. Claim 64 states that the capacitance between the bias and capacitor electrodes has non-negligible tuning characteristics. Claims 65-66 focus on the thickness of the bias electrode, with claim 4 stating that it is less than about 0.01 microns and claim 5 stating that it is less than about 0.1 skin depths.

Authorization to Charge Additional Fees to Deposit Account

A check for \$930.00 is submitted herewith in payment of the three month extension fee. No further fees are believed due in connection with this response. Should the undersigned be incorrect in this regard, the Commissioner is hereby authorized to charge any additional fees due to Procopio's Deposit Account No. 50-2075.

Conclusion

For the reasons set forth above, applicant submits that this application is now in condition for allowance.

Respectfully submitted,

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